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Forest Insect and Disease Management

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BIOLOGICAL
EVALUATION R2-77-1

EXAMINATION OF BESSEY
NURSERY STOCK

FOR

WESTERN GALL RUST

MAY 1977

Rocky Mountain Region

U.S. Department of Agriculture Forest Service

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PREPARED BY: David W. Johnson

David W. Johnson
Plant Pathologist

Thomas D. Landis

Thomas D. Landis
Plant Pathologist

APPROVED BY:

G. L. DOWNING
Staff Director
Forest Insect and Disease Management

F. A. Dorrell

F. A. DORRELL
Deputy Regional Forester
State and Private Forestry

INTRODUCTION

During 1971, Forest Insect and Disease Management personnel made a decision to periodically sample ponderosa pine seedlings from the USDA, Forest Service Bessey Nursery, located in Halsey, Nebraska, for the presence of western gall rust, *Endocronartium harknessii* (refer to memorandum 5200, Forest Insect and Disease Control, dated 11/30/71 - Subject: "Trip to Bessey Nursery and District, Downing and Brown." Also Biological Evaluation - R2-76-2, May 1976).

METHODS AND MATERIALS

As early as 1963, various research and pest control personnel noticed infection of the nursery stock, apparently from spores released from infected trees near the nursery beds. Several persons expressed concern that the rust may be inadvertently spread to other areas of the Region through outplanting of infected nursery-grown seedlings.

Western gall rust has previously been reported on a very low percentage of the nursery stock - 0.5 to 4 percent. Since 1971, 1,000 seedling samples have been collected at two-year intervals to more accurately determine infection rates for nursery stock inspected and cleared for shipment.

Each 1,000 tree sample was shipped to the Colorado State Forest Service Nursery at Fort Collins and potted. The seedlings were maintained in a lath house at the Colorado State University for two or three years to allow gall rust symptoms to appear (Figure 1).

Figures 1, 2, 3, 4 (Facing Page)

Western gall rust evaluation of Bessey Nursery stock

(1) Examination of 4-year old ponderosa pine seedlings for western gall rust.

(2) Two seedling infected by the rust, one live (left), one dead (right). Both galls are located within the second internode on the main stem.

(3) Close-up of a sporulating rust gall.

(4) Ellipsoid-shaped aeciospores with warty, thick walls.

1

2

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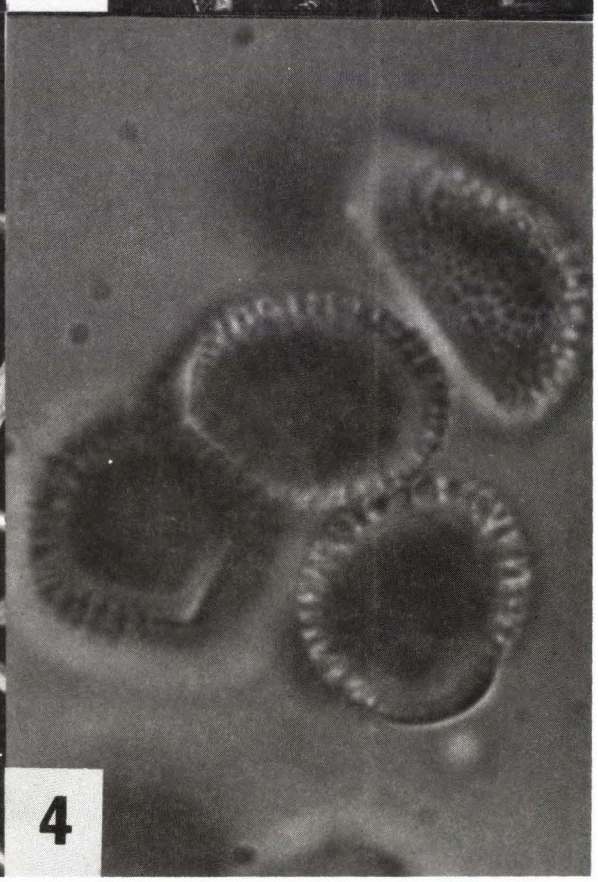

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RESULTS

The following data are for all the samples taken to date:

Year Sampled	Examination Date	Seedlings Examined	Live	Dead	Rust Infected No.	Rust Infected % of Examined	Missing 1/
1971	7/15/74	655	522	133	0	0	345
1973	5/13/76	677	587	89	1	0.1	323
1975	5/19 and 23/77	992	969	23	5	0.5	8

1/ The large number of missing trees for the 1971 and 1973 samples was attributed to vandalism. Corrective action was taken in 1975 to prevent this type of loss.

The 1977 seedling sample (1,035 trees) will be examined in 1979.

Results of the samples to date indicate that gall rust incidence is low on ponderosa pine seedlings from Bessey Nursery. The slight increase in rust infections over the 3 examinations should not be misinterpreted as disease intensification. The first two samples collected were not random and probably do not reflect the seedling population as a whole. Also the large number of missing trees in these samples cast doubt on their reliability.

During the 1977 survey all rust galls were located within the second internode which indicates new needles were infected during the second growing season at the nursery (Figures 2, 3, 4). Because gall formation takes time to develop, these latent infections are probably not visible during the culling and grading operation.

During a recent conversation Paul Forward, Nursery Superintendent, said that pine windbreaks at the nursery had recently been examined and rogued for galls. This practice should be conducted annually to reduce inoculum density around the seedbeds.

CONCLUSIONS AND RECOMMENDATIONS

Based on the recent evaluation of nursery planting stock, western gall rust does not appear to be a problem at Bessey Nursery at the present time. If a conscientious effort is made to rogue out rust galls around the nursery, the inoculum level should not build up to damaging levels.

A final evaluation will be made after examination of the 1977 seedling sample in 1979.